**Remarks/Arguments:**

With this amendment, the applicants amend claims 1 and 9. Claim 1 incorporates the limitations of claim 8, namely, that the "amount of catalysed support incorporated into the membrane is such that the metal loading is lower than $0.1mg/cm^2$." Claim 8 is canceled. Claim 9 is amended to correct its dependency from now cancelled claim 8, to claim 1. No new matter has been added. Claims 1, 3-7, and 9-24 are pending.

**I. The Office Action**

In the Office Action dated February 4, 2004, claims 1, 3-5, 13 stand rejected under 35 U.S.C. § 102(b) as being anticipated by EP 791,974. Claims 1, 3, 4, and 11-23 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Denton et al. (U.S. Pat. No. 6,042,958). Claims 6-10 also stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Denton as applied to claims 1, 3, 4, 11-22 in view of EP 875,524.

The applicants appreciate the Examiner's removal of the rejection of claims 1, 2-4, 11, 12, 16, and 20-23 as being anticipated by Cisar et al. (U.S. Pat. No. 5,635,039).

**II. Lack of Anticipation**

**A. Lack of Anticipation by EP 971 974**

The applicants respectfully traverse the Office Action rejection in view of EP 971 974. The Office Action asserts that EP 971 974 discloses a process for manufacturing a polymer electrolyte membrane. Page 5 of the Office Action states, "While the layer (of EP 791 974) is used as a cathode in the invention, the Nafion material *inherently* is an ion conducting polymer membrane as it transfers ions to and from the cathode material" (emphasis added). Nafion is an ion conducting polymer, however, it is not correct to say that Nafion is inherently a "polymer electrolyte membrane" as required by claim 1 of the present invention.

The applicants read the rejection that Nafion is inherently a polymer electrolyte membrane to stand for the proposition that it is common knowledge in the art that Nafion is necessarily an ion conducting polymer. In view of M.P.E.P. § 2144.03, the applicants submit that it is not well know in the art that Nafion is inherently an ion-conducting polymer and as such, the Office Action is taking notice of facts beyond that which are taught by EP 971 974. As

noted by the court in *In re Ahlert*, 424 F.2d 1088, 1091, 165 USPQ 418, 420 (CCPA 1970), the notice of facts beyond the record which may be taken by the examiner must be "capable of such instant and unquestionable demonstration as to defy dispute" (citing *In re Knapp Monarch Co.*, 296 F.2d 230, 132 USPQ 6 (CCPA 1961)).

The applicants submit that EP 971 974 does not make clear that the disclosed Nafion necessarily is an ion-conducting polymer, which is capable of instant and unquestionable demonstration as to defy dispute. A "membrane" is generally defined as any thin, often pliable, sheet or layer, especially one forming a barrier or lining. A "membrane" is specifically defined in the Fuel Cell Glossary issued by the US Fuel Cell Council as "the separating layer in a fuel cell that acts as electrolyte (a ion-exchanger) as well as a barrier film separating the gases in the anode and cathode compartments of the fuel cell" (see enclosed pages). So, a "polymer electrolyte membrane" as required by claim 1 is a sheet or layer that functions as an electrolyte that is in ion-conducting but not electronically conducting. The cathode of EP 791 974 comprises electronically conducting carbon-supported catalyst and is electronically conducting. The cathode layer cannot be described as a "polymer electrolyte membrane" as it does not function as an electrolyte or as a barrier. Therefore, independent claim 1 is neither disclosed nor rendered obvious by EP 791 974.

**B. Lack of Anticipation by Denton et al. (US 6,042,958)**

Claim 1 as amended recites that the "amount of catalysed support incorporated into the membrane is such that the metal loading is lower than 0.1mg/cm$^2$." Denton et al. does not disclose that the amount of catalysed support incorporated into the membrane is such that the metal loading is lower than 0.1mg/cm$^2$. The Examiner has acknowledged this on Page 4 of the Office Action of 7/18/03. Therefore, in view of the newly added limitations, claim 1 is neither disclosed nor rendered obvious by Denton et al.

**II. Nonobviousness**

Claim 1 is amended to incorporate the metal loading values as discussed above. Denton et al. fails to teach the amount of catalyst to be incorporated into the membrane to be lower than 0.1mg/cm$^2$. EP 875 524 fails to fill that void because EP 875 524 relates to electrocatalysts in electrode layer whereas the present invention relates to catalysts

incorporated in an ion-conducting membrane. The teaching of EP 875 524 would not motivate the skilled person to prepare a membrane by the process of claim 1.

**III. Conclusion**

The applicants respectfully submit that the Nafion, as taught by EP 971 974, is not necessarily an ion-conducting polymer and have provided argument and evidence to that effect. Claim 1 as amended recites specific metal loading values. As acknowledged by the Examiner, Denton et al. does not teach such values and that one skilled in the art would not be motivated to combine EP 875 524 with Denton et al. because EP 875 524 relates to electrocatalysts in electrode layer whereas the present invention relates to catalysts incorporated in an ion-conducting membrane. The applicants submit that claim 1 is in a condition for allowance. As the remaining claims depend either directly or indirectly from claim 1, they are also in a condition for allowance.

Respectfully submitted,

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CRL/lrb
Attachments: Pg. 22 of the Fuel Cell Glossary (Second Edition - May 2000) issued by the US Fuel Cell Council

Dated: April 5, 2004

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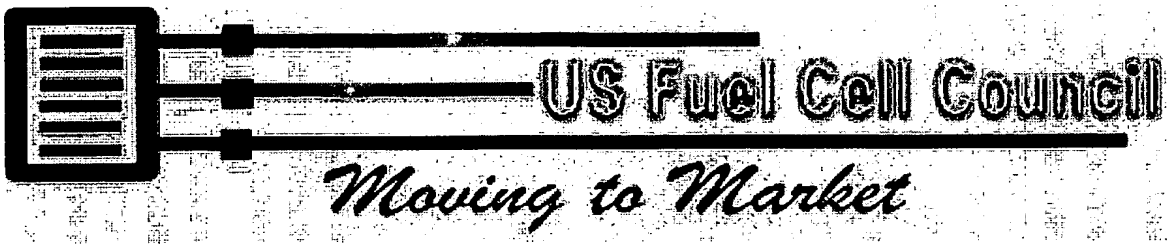


# FUEL CELL GLOSSARY

## Second Edition – May 2000

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**MAXIMUM OPERATING PRESSURE. See OPERATING PRESSURE, MAXIMUM.**

**MEANTIME BETWEEN FAILURES (MTBF).**

The mean exposure time between consecutive failures of a component. It can be estimated by dividing exposure time by the number of failures in that period, provided that sufficient number of failures has occurred in that period.

**MEANTIME BETWEEN FORCED OUTAGE (MTBFO).**

A measure of the reliability of a power source, equal to its average operating between forced outages, as calculated on a statistical basis from the known failure rates of various components of the power source.

**MEAN TIME TO REPAIR (MTR).**

The time interval (hours) that may be expected to return failed equipment to proper operation.

**MEMBRANE.**

The separating layer in a fuel cell that acts as electrolyte (a ion-exchanger) as well as a barrier film separating the gases in the anode and cathode compartments of the fuel cell.

**MEMBRANE ELECTRODE ASSEMBLY (MEA).**

Structure consisting of a proton-exchange membrane with surfaces coated with catalyst/carbon/binder layers and sandwiched by two microporous conductive layers (which function as the gas diffusion layers and current collectors).

**MIXER.**

The combination of mixer head, mixer throat and mixer tube.

Mixer Head. The portion of an injection (Bunsen) type burner, usually enlarged, into which primary air flows to mix with the gas stream.

Mixer Throat. The portion of the mixer which has the smallest cross-sectional area and which lies between the mixer head and the mixer tube.

Mixer Tube. The portion of the mixer that lies between the throat and the burner head.

**MIXER FACE.**

The air inlet end of the mixer head.

**MODE.**

Disconnect. A condition of disconnection of the power plant from a utility grid following a clearing of the interrupt mode.

Interrupt. A condition of momentary interruption of the current flow from the power plant to a utility grid.